

Delrey Bridge (Spring Creek Bridge)
Spanning Spring Creek
Delrey
Iroquois County
Illinois

HAER No. IL-35

HAER
ILL,
38-DEL,
1-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
Rocky Mountain Regional Office
National Park Service
U. S. Department of the Interior
P. O. Box 25287
Denver, Colorado 80225

HISTORIC AMERICAN ENGINEERING RECORD

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Location: Spanning Spring Creek on Iroquois County Route 47
0.4 miles east of U. S. Route 45 near Delrey, Iroquois
County, Illinois

Latitude: 40° - 40.7'
Longitude: 88° - 0.5'
Route: SA-12-B
Section: 67x1-15D
Station: 18+100
NW1/4 of NW1/4 of Sec. 1, T 25 N, R 11 E
Iroquois County
Quad: Sheldon

Date of Construction: 1883 - near Iroquois, Concord Township
1931 - relocated at present location near Delrey,
Onarga Township

Builder/Designer: King Iron Bridge and Manufacturing Company
Cleveland, Ohio

Present Owner: State of Illinois
Department of Transportation
Springfield, Illinois

Present Use: Vehicular, to be replaced. Projected date of removal
is October 1991.

Significance: This single span truss is one of three remaining
Whipple trusses on the Illinois inventory. The
bridge was fabricated by the King Iron Bridge and
Manufacturing Company of Cleveland, Ohio.

Historian: John B. Nolan, S.E.
July 1988

1. HISTORY

The Spring Creek Bridge, now located near Delrey, has served the needs of Iroquois County residents for over a hundred years at two locations. It was first erected in 1883 at Iroquois to span the Iroquois River.

Old Bunkum, the predecessor of Iroquois, had been settled in 1823, where the Vincennes Trail forded the Iroquois River by Gurdon S. Hubbard, superintendent of the Illinois River fur trade for the American Fur Company. Old Bunkum existed as a trading post until the fur business declined in the region. In 1832, Hubbard converted his stock into "white goods."

By the 1830s, throngs of adventurers and settlers were pouring into northeastern Illinois over the Vincennes-Chicago Trail, known in this vicinity during the pioneer period as the Hubbard Trace. In 1834, the legislature caused a state road to be laid out to connect Vincennes and Chicago. Marked with milestones, it was commonly known as the "State Road." It is presumed to have crossed the Iroquois River at Iroquois. With the coming of railroads, the old state road was superseded and abandoned.

Of several towns clustered around the river, only Iroquois has survived. No record of early bridges has been found, but Iroquois is served by a railroad and its location as a trade center would have made a bridge over the Iroquois expedient.

In 1833, the King Iron Bridge and Manufacturing Company of Cleveland, Ohio, constructed a 160-foot bridge over the Iroquois River at this location. No plans of the bridge, a Whipple truss, are available, but an early county highway field book includes a sketch and member details of the original bridge. This record was made prior to 1931, when the State Bond Issue Route 116 was built through Iroquois and the Whipple truss was replaced. The notes reported the cut stone abutments to be in good condition. This route was designated U. S. 52, sometime after 1935.

The field notes also include "Built 1883 by King Iron Bridge Company, Cleveland, Ohio." Presumably, this is a reference to the name plate, which has since disappeared.

Official Proceedings of the Iroquois County Board of Supervisors for the Special February Session 1932 include the following report:

When State Issue Route 116 was built through the Village of Iroquois the 160 ft. steel bridge was moved to one side by your county highway department to be used as a

detour while the new bridge was being built. After it was no longer needed for that purpose we took it down and stored it in our storage yard near Watseka.

Last summer we hauled it to a point on State Aid Route 12-B near Del Rey and erected it over the new channel that had been dredged for Spring Creek. Instead of building concrete abutments for this bridge we drove creosoted piling on top of which was poured a concrete cap for a foundation for the bridge. The creosoted block floor that was on the bridge before it was taken down was also saved and used again.

Formerly at Iroquois, the Whipple truss, after relocation to the Spring Creek crossing in 1931, has served for over a half century on County Highway 47 near Delrey.

County Highway 47, built in 1928, provides an east-west connection across much of Iroquois County. It is part of the county's network of one-lane, 10-foot-wide concrete pavements placed during that era. Some of these routes have never been widened, and vehicles, meeting or passing, continue to move to the shoulders on each side.

At its present location, the bridge provides convenient access to Onarga (population 1,269), a shopping center on the western side of the county. Today, the bridge is used by less than 90 vehicles a day and is posted for an 8-ton load, one vehicle at a time, and a 10 m.p.h. speed limit.

II. THE BRIDGE

A. The Bridge Type

The Spring Creek Bridge is a through truss, featuring sloping end panels and diagonal bracing of a relatively distinctive design. It differs from a Pratt truss, in that the diagonals extend across two panels; hence, the classification "double intersection." The lengthened diagonals were thought to offer a load carrying advantage for longer spans.

Commonly called a Whipple truss, the design was patented in 1847 by Squire Whipple, a civil engineer who made mathematical and philosophical instruments in Utica, New York. Whipple, who at one time had designed bridges for the Baltimore and

Ohio Railroad, had patented a bowstring arch bridge in 1841 and, in 1847, published the first essays on the rational calculation of stresses and the proportioning of truss members.

Whipple designated his 1847 patent as a "trapezoidal truss." It included diagonals extending through two panels and utilized cast iron as vertical compression members and wrought iron for tension stresses. By 1883, iron members were replaced with steel, which had become acceptable as an economical and practical alternative.

The idea of using eyebars was introduced by John W. Murphy, Chief Engineer of the Lehigh Valley Railroad, and the truss system resulting from this combination of ideas is sometimes known as a Whipple-Murphy truss. Murphy was the first to use pin connections, a unique feature of American truss bridges until the turn of the century, when it was replaced by the European practice of riveted joints.

Few examples of Whipple trusses remain today, but in the era before the 1880s, this pin-connected bridge type filled a niche in American bridging progress until the simpler Pratt design became the standard which would dominate the bridge field for some forty years.

B. The Manufacturer

The King Iron Bridge and Manufacturing Company of Cleveland, Ohio, was incorporated in 1871 by Zenas King. King was a leading manufacturer of metal truss bridges and claimed to have the largest highway bridge works in the United States. At the close of the 19th century, the company was building some twenty structures annually. At that time, bridge companies acted as designers, fabricators, and builders. The firm's name was changed to the King Bridge Company around 1892. Three other bridges in Illinois bear name plates of the King companies.

C. Description

The bridge is 160 feet 9 inches long, having 10 panels of approximately 16 feet 0 inches.

Clear width between railings: 16 feet 2 inches

Center to center distance between upper and lower chords: 20 feet 0 inches.

Clear height above the roadway at portal - 16 feet 3 inches.

Truss members: Details are symmetrical about the U5-L5 centerline.

Upper chords and end posts:

Two 8-inch channels with 12x3/8-inch top plate and stay plates at 4-foot centers.

Lower chords - eyebars:

L0-L2 2 bars 2-1/2x3/4-inches
L2-L3 2 bars 3x7/8 inches
L3-L4 4 bars 3-1/2x1/2 inches
L4-L5 4 bars 3-1/2x5/8 inches

Verticals:

U1-L1 2 rods 7/8 inch, loop ends
U2-L2 2 5x1-3/4 inch channels with single lacing on each side
U3,4,5,-L3,4,5 2 4x1-5/8-inch channels with single lacing on each side

Openings M2-M8 are framed with stay plates, two-panel diagonals passing through these openings are clamped to the insides of vertical channels or to each other with U-bolts.

Diagonals - eyebars:

U1-L1 2 bars 2-1/2x1/2 inches
U1-L3 2 bars 3x1/2 inches
U2-L4 2 bars 2x1/2 inches
U3-L5 2 bars 1x5/8 inches
U4-L6 1 bar 7/8x7/8 inch, 1-1/8-inch upset thread, sleeve nut
U5-L3 1 bar 3/4 inch diameter, 1-inch upset thread, turnbuckle
U6-L4 1 bar 7/8x7/8 inch, 1-1/8-inch upset thread, sleeve nut

Longitudinal rods:

U1-M2-M8-U9 7/8-inch diameter single span rods connect all mid-height stay plates.

Floor beams:

Fabricated and haunched, 8 inches at ends,
2 feet 0 inches at center.
2Ls 2x2x1/4-inches along edges, 1/4-inch web plate
U-hangers, L2-L8, 1-1/4x1-1/4-inches, 1-1/2 inch
upset threads

Stringers: six 9x4-1/4-inch I-beams, and two 8x2-3/8 inch
channels at edges.

Pins at Panel Connections: 2-1/4-inch diameter
End Bearings: Cast shoes, 2-3/4-inch diameter pins

Rivets: 3/4-inch diameter in main members.

Bracing at the upper chord level consists of a 6x1-3/4-inch
I beam at each panel point with a bent 2-1/2-inch bar knee
bracing 2 inches from each end. Lateral X-rods with
turnbuckles fill each panel. The portal is a light lattice
assembly of minimal depth.

The lack of a sway frame and use of light bracing at the
upper chord level indicates little concern was allowed in
the design for wind and other transverse loading.

The design loading is not known, but the multiplicity of
member sizes indicates careful proportioning. All members
are believed to be carbon steel with a probable unit design
stress of 12,500 psi.

The bridge deck consists of a sand seal surface over the
original wood block flooring. Creosoted blocks are 3 inches
deep, 4 inches wide with random lengths, varying between 4
inches and 8 inches, laid transversely on a longitudinal
timber subfloor, 3 inches thick.

D. Present Condition and Modification

The bridge is painted, and members and connections are in very
good condition. The current eight-ton posting is due to the
lightness of the original components, not to deterioration.
There is no evidence of modification to the original structure.

E. Ownership and Future

The Delrey (Spring Creek) Bridge is owned and maintained by the Illinois Department of Transportation. Due to the narrow roadway and low load-carrying capacity, the department is currently planning to replace this structure. Although the bridge, because of age and configuration, is of more than usual structural interest; its location and size make preservation for recreational purposes an unlikely alternative.

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D. Interviews:

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